

Dental Materials Fact Sheet

What About the Safety of Filling Materials?

Throughout the state of California the dental profession and the Dental Board of California continue to make their primary goal the health of the patient and the safety of their dental treatment. The purpose of this **Fact Sheet** is to provide you with information concerning the risks and benefits of all the dental materials used in the restoration (filling) of teeth.

The Dental Board of California is required under the Business and Professions Code 1648.10-1648.20 to make this dental fact sheet available to every licensed dentist in the state of California. Your dentist is also required to provide this fact sheet to every new patient and all patients of record **only once**, prior to beginning any dental restorative (filling) procedures. The law also states that you, the patient, must acknowledge that you have received the fact sheet by your signature. This acknowledgement will become a part of your dental record.

You, the patient, parent, or guardian, are strongly encouraged to discuss with your dentist the facts presented concerning the filling materials being considered for your particular treatment.

Components in dental restorative (filling) materials may, in rare instances, cause local side-effects or allergic reactions. The risks of adverse reactions are very low for all types of filling materials.

ALLERGIC REACTIONS

Dental restorative (filling) materials, as well as other materials that we come in contact with in our daily lives, also have the potential to cause allergic reactions. There are individuals who may be susceptible and have allergic or adverse reactions to specific components of the various filling materials such as mercury, nickel, chromium and/or beryllium alloys. Usually, the allergy reveals itself as a skin rash and is easily reversed when the individual is not in contact with the material.

No documented cases of allergic reactions have been reported for composite resin, glass ionomer, resin ionomer, and porcelain. Rare allergic response has been reported with dental amalgam, porcelain fused to metal, gold alloys, and nickel or cobalt-chrome alloys.

Individuals with allergies should discuss these potential problems with their dentist before a filling material is chosen.

TOXICITY

Dental Amalgam

Mercury in its elemental form, is on the State of California's Proposition 65 list of chemicals known to the state to cause reproductive toxicity. Mercury may harm the developing brain of a child or fetus.

There is discussion about the risks of mercury in dental amalgam. Dental amalgam is the end product of mixing elemental mercury, (43-54%), and an alloy powder, (57-46%) composed mainly of silver, tin and copper. Dental amalgam contains elemental mercury that is emitted in minute amounts as vapor. Some concerns have been raised regarding possible toxicity. Scientific research continues on the study of the safety of dental amalgam.

According to the Center for Disease Control, there is scant evidence that the health of the vast majority of people with amalgam is compromised.

The Food and Drug Administration (FDA) and other organizations of the U.S. Public Health Service have investigated the safety of amalgam used in dental fillings. The conclusion is no valid scientific evidence has shown that amalgams cause harm to patients with dental restorations, except in rare cases of allergy. The World Health Organization reached a similar conclusion stating "Amalgam restorations are safe and cost effective."

There exists a diversity of opinions regarding the safety of dental amalgams. Questions have been raised about its safety in pregnant women, children and diabetics; however, scientific evidence and the research literature in peer-reviewed scientific journals suggests that otherwise healthy women, children, and diabetics are not at an increased risk from dental amalgams in their mouth. The U.S. Food and Drug Administration places no restrictions on the use of dental amalgam in any subpopulation.

Composite Resin

Some Composite Resin includes Crystalline Silica, which is on the State of California's Proposition 65 list of chemicals known to the state to cause reproductive toxicity.

It is always a good idea to discuss any dental treatment thoroughly with your dentist.

Dental Amalgam Fillings

Dental amalgam is a self-hardening mixture of silver-tin-copper alloy powder and liquid mercury and is sometimes referred to as silver fillings because of its color. It is often used as a filling material and replacement for broken teeth.

Advantages

- Durable; long lasting
- Wears well; holds up well to the forces of biting
- Relatively inexpensive
- Generally completed in one visit
- Self-sealing; minimal to no shrinkage and resists leakage
- Resistance to further decay is high, but can be difficult to find in early stages
- Frequency of repair and replacement is low

Disadvantages

- Refer to "*What About the Safety of Filling Materials*"
- Gray colored, not tooth colored
- May darken as it corrodes; may stain teeth over time
- Requires removal of some healthy tooth
- In larger amalgam fillings, the remaining tooth may weaken and fracture
- Because metal can conduct hot and cold temperatures, there may be a temporary sensitivity to hot and cold.
- Contact with other metals may cause occasional, minute electrical flow

Composite Resin Fillings

Composite fillings are a mixture of powdered glass and plastic resin, sometimes referred to as white, plastic, or tooth-colored fillings. It is used for fillings, inlays, veneers, partial and complete crowns, or to repair portions of broken teeth.

Advantages

- Strong and durable
- Tooth colored
- Single visit for fillings
- Resists breaking
- Maximum amount of tooth preserved
- Small risk of leakage if bonded only to enamel
- Does not corrode
- Generally holds up well to the forces of biting depending on product used
- Resistance to further decay is moderate and easy to find
- Frequency of repair or replacement is low to moderate

Disadvantages

- Refer to "*What About the Safety of Filling Materials*"
- Moderate occurrence of tooth sensitivity; sensitive to dentist's method of application
- Costs more than dental amalgam
- Material shrinks when hardened and could lead to further decay and/or temperature sensitivity
- Requires more than one visit for inlays, veneers, and crowns
- May wear faster than dental enamel
- May leak over time when bonded beneath the layer of enamel

Glass Ionomer Cement

Glass ionomer cement is a self-hardening mixture of glass and organic acid. It is tooth-colored and varies in translucency. Glass ionomer is usually used for small fillings, cementing metal and porcelain/metal crowns, liners, and temporary restorations.

Advantages

- Reasonably good esthetics
- May provide some help against decay because it releases fluoride
- Minimal amount of tooth needs to be removed and it bonds well to both the enamel and the dentin beneath the enamel
- Material has low incidence of producing tooth sensitivity
- Usually completed in one dental visit

Disadvantages

- Cost is very similar to composite resin (which costs more than amalgam)
- Limited use because it is not recommended for biting surfaces in permanent teeth
- As it ages, this material may become rough and could increase the accumulation of plaque and chance of periodontal disease
- Does not wear well; tends to crack over time and can be dislodged

Resin-Ionomer Cement

Resin ionomer cement is a mixture of glass and resin polymer and organic acid that hardens with exposure to a blue light used in the dental office. It is tooth colored, but more translucent than glass ionomer cement. It is most often used for small fillings, cementing metal and porcelain metal crowns and liners.

Advantages

- Very good esthetics
- May provide some help against decay because it releases fluoride
- Minimal amount of tooth needs to be removed and it bonds well to both the enamel and the dentin beneath the enamel
- Good for non-biting surfaces
- May be used for short-term primary teeth restorations
- May hold up better than glass ionomer but not as well as composite
- Good resistance to leakage
- Material has low incidence of producing tooth sensitivity
- Usually completed in one dental visit

Disadvantages

- Cost is very similar to composite resin (which costs more than amalgam)
- Limited use because it is not recommended to restore the biting surfaces of adults
- Wears faster than composite and amalgam

Porcelain (Ceramic)

Porcelain is a glass-like material formed into fillings or crowns using models of the prepared teeth. The material is tooth-colored and is used in inlays, veneers, crowns and fixed bridges.

Advantages

- Very little tooth needs to be removed for use as a veneer; more tooth needs to be removed for a crown because its strength is related to its bulk (size)
- Good resistance to further decay if the restoration fits well
- Is resistant to surface wear but can cause some wear on opposing teeth
- Resists leakage because it can be shaped for a very accurate fit
- The material does not cause tooth sensitivity

Disadvantages

- Material is brittle and can break under biting forces
- May not be recommended for molar teeth
- Higher cost because it requires at least two office visits and laboratory services

Nickel or Cobalt-Chrome Alloys

Nickel or cobalt-chrome alloys are mixtures of nickel and chromium. They are a dark silver metal color and are used for crowns and fixed bridges and most partial denture frameworks.

Advantages

- Good resistance to further decay if the restoration fits well
- Excellent durability; does not fracture under stress
- Does not corrode in the mouth
- Minimal amount of tooth needs to be removed
- Resists leakage because it can be shaped for a very accurate fit

Disadvantages

- Is not tooth colored; alloy is a dark silver metal color
- Conducts heat and cold; may irritate sensitive teeth
- Can be abrasive to opposing teeth
- High cost; requires at least two office visits and laboratory services
- Slightly higher wear to opposing teeth

Porcelain Fused to Metal

This type of porcelain is a glass-like material that is "enameled" on top of metal shells. It is tooth-colored and is used for crowns and fixed bridges

Advantages

- Good resistance to further decay if the restoration fits well
- Very durable, due to metal substructure
- The material does not cause tooth sensitivity
- Resists leakage because it can be shaped for a very accurate fit

Disadvantages

- More tooth must be removed (than for porcelain) for the metal substructure
- Higher cost because it requires at least two office visits and laboratory services

Gold Alloy

Gold alloy is a gold-colored mixture of gold, copper, and other metals and is used mainly for crowns and fixed bridges and some partial denture frameworks

Advantages

- Good resistance to further decay if the restoration fits well
- Excellent durability; does not fracture under stress
- Does not corrode in the mouth
- Minimal amount of tooth needs to be removed
- Wears well; does not cause excessive wear to opposing teeth
- Resists leakage because it can be shaped for a very accurate fit

Disadvantages

- Is not tooth colored; alloy is yellow
- Conducts heat and cold; may irritate sensitive teeth
- High cost; requires at least two office visits and laboratory services

The durability of any dental restoration is influenced not only by the material it is made from but also by the dentist's technique when placing the restoration. Other factors include the supporting materials used in the procedure and the patient's cooperation during the procedure. The length of time a restoration will last is dependent upon your dental hygiene, home care, and diet and chewing habits.